

# Claims

[c1] We claim as our invention:

1. An iron golf club head comprising:

a periphery member composed of a first metal material, the periphery member having a sole wall, a toe wall extending upward from the sole wall at a first end of the sole wall, a hosel extending upward from the sole wall at a second end of the sole wall, a heel wall extending upward from the sole wall, and a top wall extending from an upper end of the toe wall to an upper end of the heel wall, the top, sole, heel and toe walls of the periphery member defining an opening;

a central member disposed in the opening of the periphery member, the central member composed of a thermoplastic polyester polyurethane having a Shore D hardness ranging from 50 to 65, the central member having a body portion with an interior surface, an exterior surface, a sole surface, a top surface, a toe surface, and a heel surface, the central member having at least one recess formed in the exterior surface of the body portion; and

a face plate composed of a second metal material, the second metal material having a lower density than the

first metal material, the face plate being coupled to the periphery member and disposed over the interior surface of the central member.

- [c2] 2. The iron golf club head according to claim 1 further comprising a second recess formed in the exterior surface of the central member.
- [c3] 3. The iron golf club head according to claim 1 wherein the first metal material has a density between  $8 \text{ g/cm}^3$  and  $12 \text{ g/cm}^3$ .
- [c4] 4. The iron golf club head according to claim 3 wherein the first metal material comprises a nickel-tungsten alloy including at least approximately 50 weight percent nickel and at least approximately 20 weight percent tungsten.
- [c5] 5. The iron golf club head according to claim 4 wherein the nickel-tungsten alloy further includes at least 20 weight percent chromium.
- [c6] 6. The iron golf club head according to claim 1 wherein the second metal material comprises a titanium alloy.
- [c7] 7. The iron golf club head according to claim 6 wherein the face plate has a thickness ranging from 0.040 inch to 0.250 inch.
- [c8] 8. The iron golf club head according to claim 1 further

comprising a medallion disposed within the recess of the exterior surface of the central member.

- [c9] 9. The iron golf club head according to claim 1 wherein the thermoplastic polyester polyurethane material of the central member has a specific gravity ranging from 1.15 to 1.30 grams per cubic centimeter.
- [c10] 10. The iron golf club head according to claim 2 further comprising a first medallion disposed in the recess of the central member and a second medallion disposed in the second recess of the central member.
- [c11] 11. The iron golf club head according to claim 1 wherein the club head has a moment of inertia  $I_{xx}$  through the center of gravity of at least  $2600 \text{ g-cm}^2$  and a moment of inertia  $I_{zz}$  through the center of gravity of at least  $2400 \text{ g-cm}^2$ .
- [c12] 12. The iron golf club head according to claim 1 wherein the periphery member has a volume percentage of the golf club head ranging from 15% to 50%, and a mass percentage of the golf club head ranging from 50% to 80%.
- [c13] 13. The iron golf club head according to claim 1 wherein the central member has a volume percentage of the golf club head ranging from 25% to 75%, and a mass percent-

age of the golf club head ranging from 10% to 30%.

- [c14] 14. An iron golf club head comprising:
- a periphery member composed of a first metal material having a density between  $8 \text{ g/cm}^3$  and  $12 \text{ g/cm}^3$ , the periphery member having a sole wall, a toe wall extending upward from the sole wall at a first end of the sole wall, a hosel extending upward from the sole wall at a second end of the sole wall, a heel wall extending upward from the sole wall, and a top wall extending from an upper end of the toe wall to an upper end of the heel wall, the top, sole, heel and toe walls of the periphery member defining an opening;
  - a central member disposed in the opening of the periphery member, the central member composed of a thermoplastic polyester polyurethane having a Shore D hardness ranging from 50 to 65, the central member having a body portion with a perimeter, an interior surface, an exterior surface, a sole surface, a top surface, a toe surface, and a heel surface, the central member having at least one recess formed in the exterior surface of the body portion, the perimeter having a plurality of tabs projecting outward, the tabs engaging an interior surface of the periphery member; and
  - a face plate composed of a second metal material, the second metal material having a lower density than the

first metal material, the face plate being mounted in the opening of the periphery member and disposed over the forward surface of the central member, the face plate having a thickness between 0.040 inch and 0.250 inch.

- [c15] 15. The iron golf club head according to claim 14 wherein the first metal material comprises a nickel-tungsten alloy including at least approximately 50 weight percent nickel and at least approximately 20 weight percent tungsten.
- [c16] 16. The iron golf club head according to claim 15 wherein the nickel-tungsten alloy further includes at least 20 weight percent chromium.
- [c17] 17. The iron golf club head according to claim 14 wherein the second metal material comprises a titanium alloy.
- [c18] 18. The iron golf club head according to claim 14, wherein the club head has a moment of inertia  $I_{xx}$  through the center of gravity of at least  $2600 \text{ g-cm}^2$  and a moment of inertia  $I_{zz}$  through the center of gravity of at least  $2400 \text{ g-cm}^2$ .
- [c19] 19. An iron golf club head comprising:  
a periphery member composed of a nickel-tungsten alloy having a density between  $9 \text{ g/cm}^3$  and  $10.5 \text{ g/cm}^3$ ,

the periphery member having a sole wall, a toe wall extending upward from the sole wall at a first end of the sole wall, a hosel extending upward from the sole wall at a second end of the sole wall, a heel wall extending upward from the sole wall, and a top wall extending from an upper end of the toe wall to an upper end of the heel wall, the top, sole, heel and toe walls of the periphery member defining an opening;

a central member disposed in the opening of the periphery member, the central member composed of a thermoplastic polyester polyurethane having a Shore D hardness ranging from 50 to 65, the central member having a body portion with a perimeter, an interior surface, an exterior surface, a sole surface, a top surface, a toe surface, and a heel surface, the central member having at least one recess formed in the exterior surface of the body portion, the perimeter having a plurality of tabs projecting outward, the tabs engaging an interior surface of the periphery member; and

a face plate composed of a titanium alloy, the face plate being mounted in the opening of the periphery member and disposed over the forward surface of the central member, the face plate having a thickness between 0.040 inch and 0.250 inch.

wherein the club head has a moment of inertia  $I_{zz}$  through the center of gravity of at least  $2400 \text{ g-cm}^2$  and a moment of inertia  $I_{xx}$  through the center of gravity of at least  $2600 \text{ g-cm}^2$ .